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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	16

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Please find below and/or attached an Office communication concerning this application or proceeding.

A2-16

Office Action Summary	Application No.	Applicant(s)
	09/460,638	FLUGAUR ET AL
	Examiner	Art Unit
	Rudy Zervigon	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 10, 2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 8 recites the limitation "the device". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640) in view of Ishikawa et al (USPat. 6,143,078). Foster et al teach a device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) and method for its fabrication consisting of:

i. a one-piece outer portion (item 271; Figure 2B; col. 18 lines 33-59) consisting of an electrically insulative material (271; "ceramic insulator"; col. 18 lines 42-43), having dimensions effective to prevent or inhibit plasma (col. 18, lines 33-58) arcing (col. 18 lines 50-58) to an electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of a plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53), and fit securely into the plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53) - as shown by Figure 2B, Foster et al teaches such a tolerance for the aperture ("within cylinder 238"; col. 18, line 53) (items 271) as being the accommodating dimensions in supporting plates 272, 241, and 239

ii. an inner opening (item 256;Fig.2B; col. 18, lines 33-58), communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a bottom and a top of the outer portion (271), the inner opening having dimensions effective to

enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2)

iii. A plasma processing chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), and located inside the aperture ("within cylinder 238"; col. 18, line 53), as claimed in claim 2

iv. A method of making a plasma processing chamber (item 40; Figure 2), the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method consisting of inserting (screws holding plates 272,239; Fig. 2B) the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) of Claim 1 into the aperture ("within cylinder 238"; col. 18, line 53), as claimed in claim 3

v. A method of processing a workpiece, consisting of the following steps, as claimed in claim 4 of:

a. exposing the workpiece (228; Figure 2B; 48; Figure 2) to a plasma (column 13, lines 35-52) in the chamber (item 40; Figure 2) as claimed in claim 2

b. transmitting a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) into or out from the chamber (item 40; Figure 2)

vi. A plasma processing chamber (item 40; Figure 2), as claimed in claim 5, having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within

cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) , and

vii. a one-piece sleeve (271; Figure 2B) inside the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Figure 2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

a. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53) and to fit securely into the aperture

b. an inner opening (conduit for RF energy; column 18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43), the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59)

viii. A method of making a plasma processing chamber (item 40; Figure 2), as claimed in claim 6, the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method comprising inserting a one-piece sleeve (271; Figure 2B) into the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Figure 2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

a. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53)

b. an inner opening (conduit for RF signal; col.18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a bottom and a top of the one-piece sleeve (271; Figure 2B), the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Figure 2B)

ix. The method of Claim 6, further comprising, prior to said inserting, the step of forming said one-piece sleeve (271; Figure 2B) to match one or more dimensions of said aperture ("within cylinder 238"; col. 18, line 53), as claimed in claim 7.

x. A method of processing a workpiece (item 228; Fig.2B), as claimed in claim 8, comprising:

a. exposing the workpiece (item 228; Fig.2B) to a plasma in a chamber (item 40; Figure 2), the chamber (item 40; Figure 2) having at least one aperture ("within cylinder 238"; col. 18, line 53) therein, the at least one aperture ("within cylinder 238"; col. 18, line 53) having:

i. an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58); and a one-piece sleeve (271; Fig.2B) in the aperture ("within cylinder 238"; col. 18, line 53), the one-piece sleeve (271; Fig.2B) consisting of an electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) and having:

ii. dimensions effective to prevent or inhibit plasma arcing (col. 18 lines 50-58) to the exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58) of the aperture ("within cylinder 238"; col. 18, line 53) ; and to fit securely into the aperture

iii. an inner opening (conduit for RF power; Col.18, line 54) communicating through the electrically insulative material (271; "A ceramic insulator"; col. 18 lines 42-43) between a bottom and a top of the one-piece sleeve, the inner opening having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Fig.2B); and

iv. transmitting a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the one-piece sleeve (271; Fig.2B) into or out from the chamber (item 40; Figure 2)

xi. A method of operating a plasma processing chamber (item 40; Figure 2), as claimed in claim 9, wherein the chamber (item 40; Figure 2) has at least one aperture ("within cylinder 238"; col. 18, line 53) therein and the aperture ("within cylinder 238"; col. 18, line 53) has an exposed electrically conductive surface (item 222; Fig.2B;col. 18 lines 50-58), the method comprising the steps of:

a. initiating a plasma in the chamber (item 40; Figure 2), the aperture ("within cylinder 238"; col. 18, line 53) having the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) of Claim 1 therein, then

b. cleaning (col.30; line 14) the chamber (item 40; Figure 2) and the device (items 271; Figure 2B; col. 18 lines 33-59; col. 18; lines 22-24)

xii. The method of Claim 9, wherein said plasma exists in said chamber (item 40; Figure 2) for a predetermined period of time (col. 3, lines 1-7), as claimed in claim 10

xiii. The method of Claim 9, as claimed in claim 11, further comprising, prior to cleaning the chamber and device (post "AES results"; column 30, lines 10-18), the steps of:

xiv. exposing a workpiece (item 228; Fig.2B) to the plasma (column 17, lines 36-60), and transmitting a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) into or out from the chamber (item 40; Figure 2)

xv. The device of claim 1, as claimed in claim 12, wherein the one-piece outer portion (271; Figure 2B) further comprises:

a. lower section (portion 270/271/256; Figure 2B) with a first length, as claimed in claim 12, contained within 238/232 and an upper portion (portion 270/271/256; Figure 2B) outside of 238/232, the lower section having a first width (diameter) effective to fit in the plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53) within a predefined tolerance

xvi. Foster teaches the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59), as claimed in claim 12, is held in the plasma processing chamber aperture via a predetermined amount of pressure against a wall of the aperture as claimed in claim 13 – the predetermined amount of pressure against a wall of the aperture as claimed is taught by Foster according to the fastening means (see screws, not labeled; Figure 2B) provided by Foster.

xvii. Foster teaches that an outer surface (top surface of 272) of the device (item 58; Figure 2; col. 18 lines 33-59; items 270-272 and conduit 256; Figure 2B; col. 18, lines 33-59) forms a non-orthogonal angle of 0° with reference to the bottom (bottom planar surface for 270, 271) of the device as claimed in claims 16 and 17

Foster does not teach that the one-piece sleeve has a flange section configured to remain outside the aperture. As a result, Foster does not teach the relative dimensions of the flange section and the lower section.

Ishikawa teaches a similar device (302; Figure 5) used to deliver process gas to a treatment chamber (column 9, lines 45-64). Specifically, Ishikawa teaches a one-piece sleeve (outer surface of 302) with a flange section (302/314 interface).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct Foster's one-piece sleeve to include a flange section configured to remain outside the aperture as taught by Ishikawa and to optimize the dimensions of the flange section and the lower section.

Motivation to construct Foster's one-piece sleeve to include a flange section configured to remain outside the aperture as taught by Ishikawa is to enhance hermeticity of the process chamber as taught by Ishikawa (column 10, lines 20-28). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

6. :

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640) and Ishikawa et al (USPat. 6,143,078) in view of Bernard J. Curtis (USPat. 4,328,068). Foster and Ishikawa are discussed above. Foster and Ishikawa do not teach a physical signal ("RF"; col. 18, line 54) from the device of claim 1 consisting of a spectroscopic endpoint detection signal or a channel therefore.

Bernard J. Curtis teaches a spectroscopic endpoint detection signal and a channel therefore (34,36,32; Figure 3; column 2, lines 59-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Foster and Ishikawa's RF physical signal as discussed above with Bernard J. Curtis's spectroscopic endpoint detection signal.

Motivation to replace Foster and Ishikawa's RF physical signal as discussed above with Bernard J. Curtis's spectroscopic endpoint detection signal is for determining the end point of the plasma etching process as discussed by Bernard J. Curtis (column 1, line 67 - column 2, line 5).

Response to Arguments

3. Applicant's arguments, see pages 13-20, filed February 10, 2003, with respect to the rejections of claims 1-14, 16, and 20 under Foster et al (USPat. 5,665,640) and 35 USC 102(b) have been fully considered and are persuasive. Therefore, the rejections has been withdrawn. However, upon further consideration, new grounds of rejection is made in view of Foster et al (USPat. 5,665,640) and 35 USC 103(a).

4. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new grounds of rejection.

5. Applicant's position that arcing (col. 18 lines 50-58) is not prevented by Foster's quartz cylinder 238 is not convincing in view of Applicant's citation of Foster's column 18, lines 50-55. In particular, Foster's quartz cylinder 238 is used to "eliminate" the metal attachment screws and thus "helps to prevent the formation of a plasma within cylinder 238 and to prevent arcing between the RF line 256 and the showerhead/electrode 222".

6. Applicant's position that Foster does not teach cleaning of the deposition chamber and the device inserted into an aperture of the chamber is not convincing. Foster's teaching of the contact etch and contact cleaning processes, of the wafer, is in reference to carrying out plasma etching and cleaning by Foster's apparatus that inherently cleans the deposition chamber and the device inserted into an aperture of the chamber.

7. With regard to Applicant's claim 13, the predetermined amount of pressure against a wall of the aperture as claimed is taught by Foster according to the fastening means (see screws, not labeled; Figure 2B) provided by Foster. Refer to the body of the above claim rejection.

8. In response to applicant's argument that there is no suggestion to combine the references of Foster et al (USPat. 5,665,640) and Ishikawa et al (USPat. 6,143,078) in view of Bernard J. Curtis (USPat. 4,328,068), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re*

Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the teachings of the prior art, here Foster et al, of "the contact etch and contact cleaning processes", of the wafer, is in reference to carrying out plasma etching and cleaning by Foster's apparatus. As such, Bernard J. Curtis (USPat. 4,328,068) provides teaching, suggestion, and motivation to combine the teachings of Foster et al (USPat. 5,665,640) and Ishikawa et al (USPat. 6,143,078) in view of Bernard J. Curtis (USPat. 4,328,068) as stated in the body of the rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPat. 5,772,771; 4,439,401; 6,070,551

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

JEFFRIE R. LUND
PRIMARY EXAMINER